AEM

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: Dennis K. Killian PAGE 1 OF 2

FROM: Jerry Hintze

DATE: May 8, 1991

SUBJECT: Boiler Combustion Testing Evaluation

FILE: 01.12.09, 14.9010

In light of Babcock and Wilcox's (B&W) recent recommendations on yet another extensive burner/combustion testing program (reference Don Langley's (B&W) April 19, 1991, letter to J. Scofield of LADWP) to determine acceptable combustion and burner operating parameters, we suggest looking into an alternative vendor to get estimates for comparable testing and modeling services and expertise.

RJM Corporation can make an on-site diagnostic review of our on-going operational problems and make recommendations for a testing program, outlining costs and requirements of each separate phase. This on-site two day evaluation is for a **fixed fee of $3500, plus expenses.**

Note, the intent of this evaluation is not to duplicate previous efforts of EER and B. Newkirk on evaluating and making recommendations on burner life and design. Our efforts, instead, are focused on alternative testing programs and options to those provided by B&W. B&W (with test assistance from IPSC) has spent tremendous efforts testing and trying to fine tune these boilers, mostly at IPP's expense. Indications at this point suggest B&W has no better test plan now, than that implemented four years ago.

Engineering Services would like to investigate more sophisticated testing and modeling techniques. RJM Corporation specializes in energy and pollution control technology. We would like for them to evaluate and make recommendations on their testing and modeling capabilities, especially in the following areas:

- Secondary Air Flow Balancing
- Fuel Flow Balancing
- Primary Air Flow Balancing
- Burner Swirl Control
- Fuel/ Air Mixing Analysis

Please approve the attached requisition to have an on-site evaluation conducted. We want to use RJM Corporation of Ridgefield, CT, to conduct the testing evaluation. Please reference the attached purchase requisition and letter from RJM for more detail. Also attached is some RJM literature on testing services.

We would like to schedule this activity the week of June 3, 1991. Attached are budget sheets that include monies for burner testing activities that we would like to utilize for this purpose.

Please contact Aaron Nissen at Extension 6482 if you have any questions concerning this matter.

AEN:dh
Attachments

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: Doug Ingraham

FROM: Dennis Killian

DATE: May 10, 1991

SUBJECT: Authorization to Purchase Boiler Combustion Testing Evaluation

FILE: 01.12.02, 14.9010

Please proceed with the attached requisition to have an on-site burner and combustion testing evaluation conducted. We want to use RJM Corporation of Ridgefield, CT to conduct this testing evaluation. Please reference the attached purchase requisition and letter from RJM for more detail. Also attached is some RJM literature on testing services.

We would like to schedule this activity the week of June 3, 1991. Attached are budget sheets that include funds for burner testing activities that we would like to utilize for this purpose.

RJM Corporation will make an on-site diagnostic review of our on-going operational problems and make recommendations for a testing program, outlining costs and requirements of each separate phase. This on-site two day evaluation is for a **fixed fee of $3500, plus expenses.**

Please contact Aaron Nissen at Extension 6482 if you have any questions concerning this matter.

AEN:dh
Attachments

[ ] REQUISITION FOR CAPITAL EQUIPMENT

[XX] PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Date 5/2/91
Req./PA No 58471
P.O. No
Vendor
Terms
FOB
Terms
Ship Via
Conf. To:

rpose of Materials, Supplies or Services:

"On-Site Diagnostics and Action Plan" for recommendations on resolving burner and combustion problems on IGS Units 1 and 2.

Suggested Vendor: RJM Corporation
Attn: Richard Monro
Ten Roberts Lane
Ridgefield, CT 06877
(203) 438-6198

Account No. 00-6528-~~00~~503

Qty	Unit	Description Noun Adjective Catalog # Seller or Manufacturer	Unit Cost	Extension
1	1	On-Site Diagnostic and Action Plan Program		$ 3,500
		on IGS Units 1 and 2 (twin units) for		
		burner and combustion recommendations.		
		In addition to the report, we would like detail		
		information on:		
		1) Secondary Air Flow Balancing		
		2) Fuel Flow Balancing		
		3) Primary Air Flow Balancing		
		4) Burner Swirl Control		
		5) Burner Swirl Control		
		Costs to include traveling and living expenses		$2,500
		Requested date is June 4-5, 1991.		
		TOTAL ESTIMATED COST		$ 6,000.

Remarks: Please contact Aaron Nissen (6482) with any questions.

Delivery requested by [Date] 6/03/91 Originator Aaron Nissen

JKH

Dept. Mgr/Supt. Date | Station Manager Date | Operating Agent Date

INTERMOUNTAIN POWER SERVICE CORPORATION Form IPSC 9A

IP7_005097

IPSC OPERATING BUDGET 1990-91
TECHNICAL SERVICES
Backup Information
($1,000's)

5) OUTSIDE SERVICES
A) Services (Cont'd)

Section	Item	$/1000s
	Turbine-Steam Path Audits	20.0
	Cooling Tower Performance Testing Services	20.0
→	Boiler Combustion Tuning by B&W	54.85
	Manfacturer's Field Service Engineers	30.0
	Certification and Licenses	7.0
	Membership (FOMIS and Other Group)	25.0
	Books and Reference Materials	8.0
	Photographic Developing Services	3.0
	Service Contract for CAD Plotter	1.0
	PEPSE - Computer Model License Fee	5.0
	Training Tuition	49.4
	Subtotal	403.25

Outside Services Totals

Admin.	28.0
Computers	586.0
I&C	91.0
Lab	158.0
Engr.	403.0
Total	1266.0

TOTAL OUTSIDE SERVICES - SERVICES 1,265.75

IP7_005098

RJM Corporation
Ten Roberts Lane
Ridgefield, CT 06877
203 438-6198

August 30, 1990

RJM

Mr. Aaron Nissen
Results Supervisor
Intermountain Power Service Corp.
Intermountain Generating Station
Rt. 1, Box 864
Delta, UT 84624

Re: RJM Proposal No.: 900832

Dear Mr. Nissen:

This letter confirms our telephone conversation and presents additional information which you might find helpful in your program.

Many factors affect pulverized coal piping fires, furnace O_2 imbalances and furnace eyebrows. Sometimes only simple burner adjustments or changes to operating procedures are needed.

However, the extent of a problem is unknown until an on-site investigations is completed. As a result, RJM Corporation recommends performing an **On-Site Diagnostic and Action Plan Program** before undertaking any of the programs listed below. If your problems can be solved with simple burner adjustments the cost of the more extensive programs might be avoided or are minimized.

Since its trial introduction on January 2, 1990, all of the utility and industrial clients who have tried the **On-Site Diagnostic and Action Plan Program** tell us it provides results beyond their expectations. Why? Because it is fast, to the point and, at the fixed fee of $3500 plus expenses, very cost-effective. The two-day program consists of three parts:

1. **Diagnostic and On-Site Corrections -**

   We begin by meeting with your operating and management personnel. During the meeting, we will discuss the problem unit's operating performance in depth. We will review relevant data and the outcome of prior corrective action attempts. Finally, we will agree on definitive objectives for the program.

   Next, RJM's combustion specialist will inspect burner set-up, equipment condition, and operating performance of the unit. Corrections to burner set-up and modifications to operating procedures are made during this part of the program.

Since we initiated this program

> ***More than 65% of the time, RJM's combustion specialist was able to correct the problem immediately or significantly alleviate problem symptoms during this initial step.***
>
> ***More than 80% of the time, improvements in operating efficiencies were achieved through these first corrective actions. Typically, the savings from these improvements have paid for the cost of this program many times over.***

Achieving 100% success may require additional work beyond the initial site visit. If so, RJM's engineers detail the scope of the needed corrective action work on a step-by- step basis.

2. Presentation -

On the second day, RJM presents the corrective action program to operating personnel and management. We define specific corrective actions, discuss the combustion dynamics, design criteria, and operational factors involved in the corrective action, and enumerate the costs and benefits that already have been achieved or can be expected. During this presentation, your operating personnel and RJM's engineers work together to refine the program, maximizing the gains for your budget dollars.

3. Formal Action Plan -

Within two weeks, we will issue a formal report that will include a summary of the visit and the detailed corrective action plan. The report is designed to give you and your management the information you need to make cost-effective decisions.

We believe it presents two significant benefits to utility clients:

1. Critical, achievable and cost-effective actions based on actual data are defined and set out in descending order of importance consistent with budget restraints.

2. Utilities are able to examine RJM Corporation's expertise in action before committing substantial sums of money to a full-scale program.

Four recent clients you may wish to contact about our **On-Site Diagnostic and Action Plan Program** work are:

1. El Paso Electric
   Mr. Juan Cordova
   (915) 543-5837

2. Western Farmers Electric
   Mr. Mark Clem
   (405) 994-5411

3. Oklahoma Gas & Electric
   Mr. Bill Million
   (405) 789-7858

4. Seminole Electric Cooperative
   Mr. Richard Micko
   (904) 328-9255

In addition to the **On-Site Diagnostic and Action Plan Program**, RJM Corporation has several unique services which might be used if required. They are:

AIRFLOW BALANCING

Airflow balancing is a unique service program using our proprietary Air Distribution Analysis technique. This program diagnoses the airflow deviations between the different zones of a burner and aids in balancing the total airflow between burners.

FUEL FLOW BALANCING

Fuel Flow Balancing is another tool of RJM Corporation used to diagnose and correct the fuel distributions between burners. On coal fired units, RJM also reports coal distributions within burners.

BURNER SWIRL CONTROL

This new program establishes the correct combustion air swirl for your burner operation using computer two dimensional flow analysis. Excessive swirl in one or more zones of the burner creates high negative velocity zones. This accelerates burnback of burner components and promotes coking formation. Also, flame patterns become short and wide resulting in wall impingement and reducing reactions on tube surfaces. Too low a swirl factor results in excessively long flame paths, low fuel/air mixing parameters and high carbon carry-over. It is RJM Corporation's experience that the majority of utility burners have incorrectly set swirl factors. This program establishes the correct swirl factor for each zone of the burner. This optimizes the combustion process,minimizes equipment damage and reduces carbon carry-over problems.

FUEL/AIR MIXING ANALYSIS

RJM Corporation maps the fuel/air mixing profile for your burner design using burner components and laser doppler scanning technology. This analysis defines those burner characteristics which minimize NO_x and maximize carbon burnout. The analysis is also useful in identifying and correcting hidden burner design defects.

OIL ATOMIZER OPTIMIZATION

Laser doppler scanning technology is employed to optimize atomizer design for particulate and NO_x control.

COAL, GAS AND OIL FLAME STABILIZERS

RJM Corporation has developed aerodynamic, swirl controlled, fuel directional flame stabilizers. These devices significantly improve fuel/air mixing and stabilize the flame front over the turndown range of the burner. Flame stabilizers are custom designed for your burner operation.

Enclosed is a reference list covering a broad spectrum of RJM's combustion services.

I trust the above is helpful to you. I will contact you within two weeks to see if you wish to proceed with the On-Site Diagnostic and Corrective Action Program.

Very truly yours,

Richard J. Monro
President

RJM/ca
Ipscsite.pro

Enclosures

RJM CORPORATION REFERENCES

RJM Corporation has been in business since 1977 and since that time has been instrumental in providing the utility industry with superior testing procedures, designs, and modifications to improve and/or correct the operational problems associated with boilers and plant operations.

RJM Corporation has designed several systems to provide improvements for the utility industry. RJM Corporation applied for two patents which have been awarded based on these designs.

The following list of references will reflect the variety of clients RJM Corporation has worked for. With due respect to those on this list, please do not call these individuals unless you are serious about working with us at your facility.

1. **United American Energy** - Mr. Ed Tomao 201-307-1818. Formerly of Northeast Utilities where we were a substantial help in overall boiler problem solving.

2. **Central Hudson Gas & Electric** - Mr. Carl Meyer V.P. 914-486-5350 and Mr. Ron Roberts 914-486-5305. We have been consultants to Central Hudson for quite some time and Mr. Meyer is aware of our specific qualifications.

3. **Blackstone Valley Electric** - Mr. Bill Bisson, President 401-333-1400. We have been instrumental in solving serious problems at this facility.

4. **BP Oil of America** - Mr. Jim McCabe 216-586-3379 and Mr. Dave Whitmer 216-586-5531. We are currently working on several projects to improve the efficiency of several ship boilers.

5. **New England Power** - Mr. Ray Kenison 617-366-9011. A previous client who used our overall services to solve serious combustion problems.

6. **Public Service of Oklahoma** - Mr. Vic Nichols 918-599-2546. Public Service of Oklahoma hired us to solve a carbon black problem. Mr. Nichols has worked with us for approximately five months and work continues on various concerns.

7. **Matson Navigation** - Mr. Bill McDermott and Mr. Chris Clements 213-519-6546. Corrected poor flame combustion process to lower O_2 and opacity.

8. **Wallingford Electric Division** - Mr. Mike Holmes 203-265-1593. Currently working on monthly projects of various natures to improve boiler operations.

9. **Consolidated Edison** - Mr. Steve Damiani 212-606-2711. Performed our Air Distribution Analysis on Consolidated Edison's tangentially fired unit to correct flame impingement and combustion concerns.

10. **Atlantic Electric** - Mr. Gary McFadden 609-645-4189. Performed Air Distribution Analysis, throat sizing modification and model specifications with project management responsibility.

11. **Nebraska Public Service** - Mr. John Cizek 308-386-2441. Performed Air Distribution Analysis to solve air distribution imbalances. Made formal report with recommendations.

12. **Dayton Power and Light** - Ms. Darina Kafka 513-549-2641 x. 5831 Performed on-site review and report to address the operational concerns of Unit No. 4 and provided estimated cost of savings with corrections in a formal report.

We hope that you find these references to be satisfactory and that we have the opportunity to work with you in the very near future.